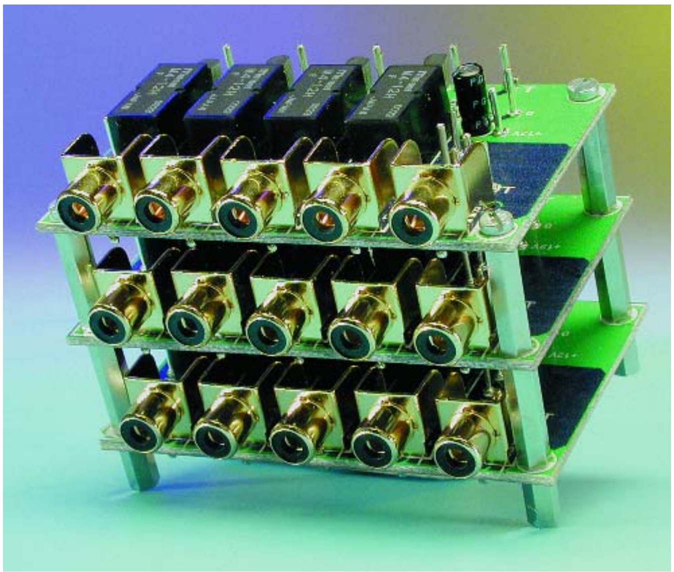
Audio/Video Switch

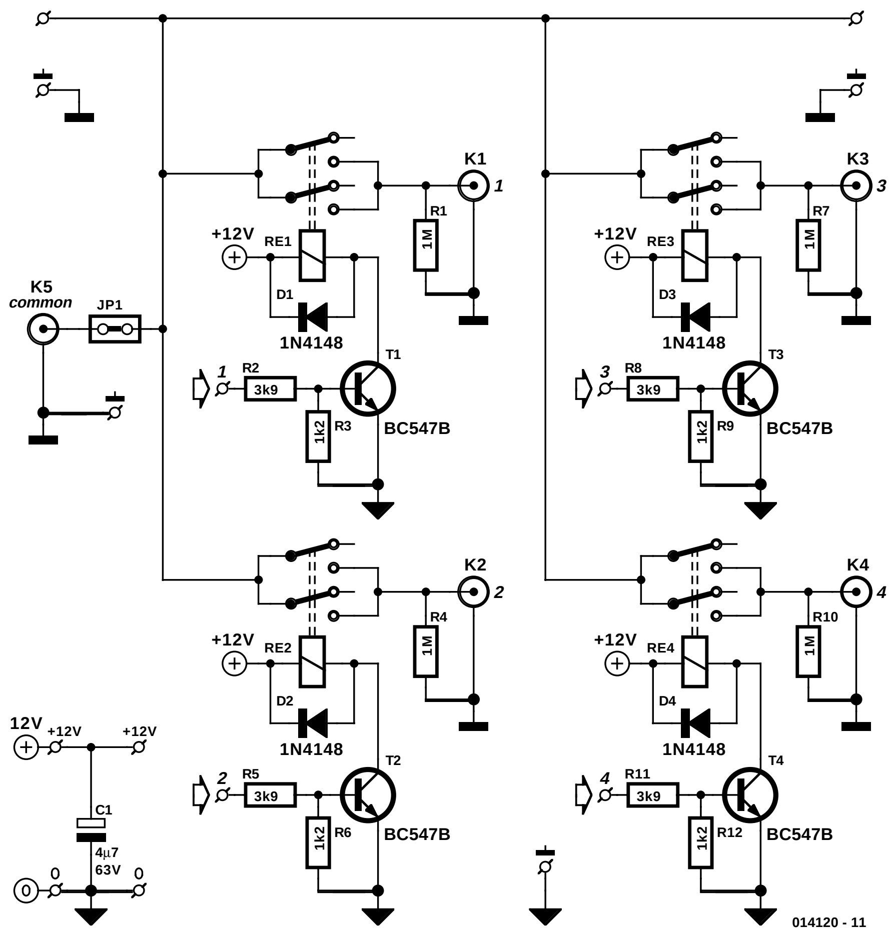
010



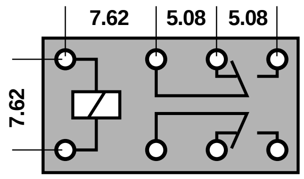
This article is mainly about the board and the uses to which it can be put. The circuit is simplicity itself and consists of four phono sockets, which can be individually switched to a fifth (common) socket. This fifth channel can be used as either an input or output. A big advantage of this type of passive switch is that the channels are electrically isolated from each other, as well as from the supply voltage for the relays. If this is not required, it is of course possible to connect all earths of the boards together.

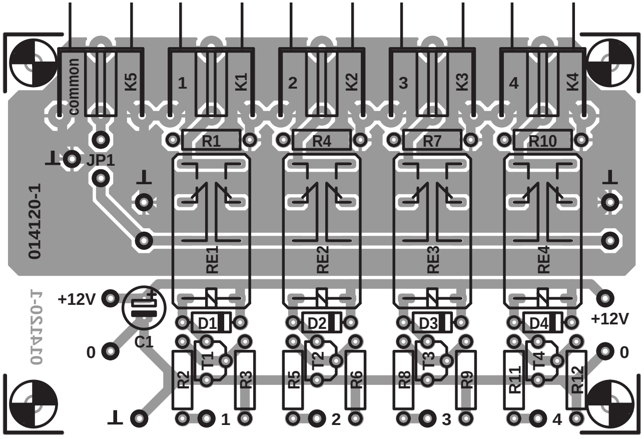
Each relay is switched by its own transistor, which is driven via a potential divider. This potential divider makes the transistor switch more cleanly. The driving voltage should be a minimum of 4 V. Elsewhere in this issue is a Simple IR Receiver, which makes a perfect match for this switch. The receiver only activates one of the four channels, but of course it would be possible to activate all relays at once if a different driver circuit is used. But when you do this you should take great care that there can't be any short circuit conditions.

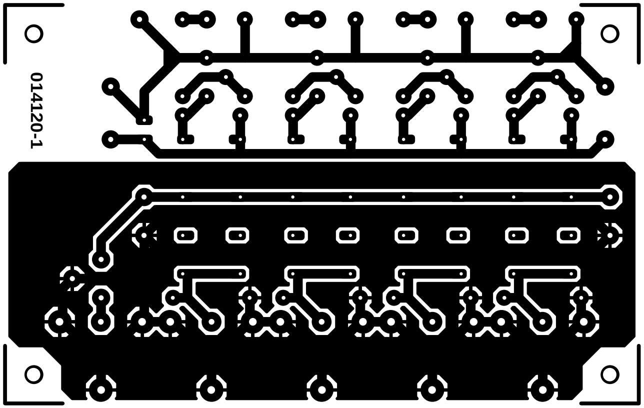
The relays used here require an operating voltage of 12 V and consume between 15 to 20 mA each. When the circuit is used to switch 5.1-surround plus video between four channels, a total of seven boards is required in parallel (that won't be cheap!). The layout facilitates the expansion of the number of I/O channels. When adding a second set of four channels the common should not be connected; this is only connected to one set by putting a wire link across JP1. The pins beside the relays should then be joined to the next board using short lengths of isolated cable. Instead of a wire link, it is also possible to connect a buffer/amplifier across JP1.This can either be a pre-amp or power amp, depending on the use of the circuit. In the circuit there are 1 MΩ resistors (R1, R4, R7, R10) mounted in parallel with each of the four channels. These pull the lines to ground when the relay is open and also act as a load for any sources which have AC-coupled signals.



RE1 ... RE4







The relays in the parts list have a standard footprint that is commonly used by many other manufacturers, but take care when using polarised relays that the polarity is correct. It is of course possible to use relays with different coil voltages.

(014120-1)

COMPONENTS LIST

Resistors:

R1,R4,R7,R10 = 1MΩ
R2,R5,R8,R11 = 3kΩ9
R3,R6,R9,R12 = 1kΩ2

Capacitors:

C1 = 4μF7 63V radial

Semiconductors:

D1-D4 = 1N4148
T1-T4 = BC547B

Miscellaneous:

JP1 = wire link (see text)
K1-K5 = cinch socket, PCB mount, e.g., Monacor/Monarch # T-709G
Re1-Re4 = mini relay, 2 c/o contacts, e.g., Conrad Electronics # 505170-24 (12V, 720Ω)